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10/564,572	05/08/2006	Thomas Kohler	PHDE030251US	2143

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EXAMINER	
CORBETT, JOHN M	
ART UNIT	PAPER NUMBER
2882	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/564,572	KOHLER ET AL.	
	Examiner	Art Unit	
	JOHN M. CORBETT	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *13 January 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The specification is objected to because it refers to claims 1-11 on pages 2-5, which may create discrepancies and new matter issues if future claim amendments were to be made. Therefore, the examiner suggests removing all references to the claims that are in the specification. Appropriate correction is required.

2. The incorporation of essential material in the specification by reference to a publication, Kak W. Kalender, "Computed Tomography: Fundamentals, System Technology, Image Quality, Applications." Publics MCD Verlag, Munich, 2000, and T. Schaffter et al., "Motion compensated projection reconstruction" Magn. Reson. Imaging, 41:954-963, 1999, is improper. Applicant is required to amend the disclosure to include the material incorporated by reference, if the material is relied upon to overcome any objection, rejection, or other requirement imposed by the Office. The amendment must be accompanied by a statement executed by the applicant, or a practitioner representing the applicant, stating that the material being inserted is the material previously incorporated by reference and that the amendment contains no new matter. 37 CFR 1.57(f).

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 12-14 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

With regards to claim 12, the claim is drawn to a computer program per se. A computer program per se is a set of abstract instructions. Therefore, a computer program is not a physical thing (product) nor a process as they are not "acts" being performed. As such, these claims are not directed to one of the statutory categories of the invention (See MPEP 2106.01), but directed to nonstatutory functional descriptive material. In the present case, a machine readable medium may include computer programs written on paper which when scanned by a scanner (i.e., the machine) can be configured to instruct a computer to perform method steps. A mere arrangement of printed matter, though seemingly a "manufacture," is not within one of the statutory categories of the invention (See MPEP 706.03(a)), but directed to nonstatutory functional descriptive material (See MPEP 2106.01).

Further, it has been held that paper having the program instructions thereon would not permit the functionality of the program to be realized. A mere arrangement of printed matter, though seemingly a "manufacture," is not within one of the statutory categories of the invention. See *In re Miller*, 418 F.2d 1392, 164 USPQ 46 (CCPA 1969); *Ex parte Gwinn*, 112 USPQ 439 (Bd. App. 1955); and *In re Jones*, 373 F.2d 1007, 153 USPQ 77 (CCPA 1967) (MPEP 706.03(a)). A printed version of a program is subject to copyright protection and is not subject to patent protection. Therefore, claims 12-14 are rejected for being directed to non-statutory subject matter.

It is noted that computer programs embodied on a computer readable medium or other structure, which would permit the functionality of the program to be realized, would be directed to a product and be within a statutory category of invention, so long as the computer readable medium is not disclosed as non-statutory matter per se (printed matter or signals or carrier waves or presented over a network such as the Worldwide Web).

An example that would make the instant claims statutory would be to claim a computer readable medium encoded with a computer program which, when implemented on a data processor, instructs the data processor to perform the desired method steps. Hence, the claims would be directed to statutory subject matter.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2 and 9-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Rasche et al. (WO02/103639 A2).

With respect to claim 1, Rasche et al. discloses a method of reconstructing an image (G) of an object (Page 1, line 2, patient) from volumetric data (D) of the object, the volumetric data include a plurality of projections (Page 5, lines 9-11, D_{ij}) corresponding to a plurality of time points (Page 5, line 12, t), the method comprising the steps of:

estimating a motion of the object (Page 5, lines 14-20, ECG used to estimate motion by determining phase);

determining first time points (phase of motion) where the motion of the object is minimal on the basis of the estimated motion of the object (Page 1, lines 15-18); and

selecting projections from the plurality of projections on the basis of the first time points (Page 5, lines 16-27 and Figure 1); and

reconstructing the image from the projections selected from the plurality of projections (Figure 1).

With respect to claim 2, Rasche et al. further discloses the volumetric data correspond to cardiac (Page 5, lines 28-34) computed tomography (CT) data (Page 5, lines 8-9) and simultaneously measured electrocardiogram data (E);

a number of low resolution images (I) corresponding to a heart region are reconstructed (Page 5, lines 28-32 and Figure 1);

the number of low resolution images correspond to a plurality of phase points of the heart (Page 5, lines 21-27 and Figure 1);

a plurality of motion fields (B) is determined for estimating the motion of the object (Page 5, lines 28-30);

the determination of the plurality of motion fields is performed for the number of low resolution images such that the plurality of motion fields describe the motion of the object between the number of low resolution images (Page 5, line 30 – Page 6, line 4);

determining a high resolution map of second time points (T) where the motion of the heart is minimal (Page 6, lines 12-15) on the basis of the first time points (Figures 1 and 2);

selecting second projections (K) from the plurality of projections on the basis of the second time points (Figures 1 and 2); and

reconstructing a high resolution image (G) from the second projections (Page 7, lines 1-5 and Figure 1 and 2).

With respect to claim 9, Rasche et al. discloses an image processing device (Figure 1), comprising:

a memory (3) for storing volumetric data (d), the volumetric data include a plurality of projections (Page 5, lines 9-11, D_{ij}) corresponding to a plurality of time points (Page 5, line 12, t); and

an image processor (4) for reconstructing an image of an object (Page 1, line 2, patient) from the volumetric data of the object, the image processor is adapted to perform the following operation:

estimating a motion of the object (Page 5, lines 14-20, ECG used to estimate motion by determining phase);

determining first time points (phase of motion) where the motion of the object is minimal on the basis of the estimated motion of the object (Page 1, lines 15-18); and

selecting projections from the plurality of projections on the basis of the first time points (Page 5, lines 16-27 and Figure 1); and

reconstructing the image from the projections selected from the plurality of projections (Figure 1).

With respect to claim 10, Rasche et al. further teaches the image processing device is a computed tomography (CT) system (Page 5, lines 8-9 and Figure 2) suitable for cardiac (Page 5, lines 28-34) CT;

the volumetric data correspond to cardiac CT data (Page 5, lines 8-9 and 28-34) and simultaneously measured electrocardiogram (E) data;

the image processor is further adapted to perform the following operation:

determining a plurality of motion fields (B) for estimating the motion of the object (Page 5, lines 28-30);

reconstructing a number of low resolution images (I) corresponding to a heart region (Page 5, lines 28-32 and Figure 1);

the number of low resolution images correspond to a plurality of phase points of the heart (Page 5, lines 21-27 and Figure 1);

the determination of the plurality of motion fields is performed for the number of low resolution images such that the plurality of motion fields describe the motion of the object between the number of low resolution images (Page 5, line 30 – Page 6, line 4);

determining a high resolution map of second time points (T) where the motion of the heart is minimal (Page 6, lines 12-15) on the basis of the first time points (Figures 1 and 2);

selecting second projections (K) from the plurality of projections on the basis of the second time points (Figures 1 and 2); and

reconstructing a high resolution image (G) from the second projections (Page 7, lines 1-5 and Figure 1 and 2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. as applied to claim 2 above, and further in view of Kachelriess et al. ("ECG-Correlated Imaging Reconstruction from subsecond multi-slice spiral CT scans of the heart", 2000, Medical Physics, Volume 27, Number 8, Page 1881).

With respect to claim 3, Rasche et al. discloses a method as recited above. Rasche et al. further discloses the reconstruction of the high resolution image is performed such that a first area of the heart in the high resolution image is determined from first portions of the volumetric data corresponding to a first phase point of the heart, and a second area of the heart in the high resolution image is determined from second portions of the volumetric data corresponding to a

second phase point of the heart, the first phase point being different from the second phase point (Page 1, lines 19-27, Page 4, lines 23-30, Page 5, line 30 – Page 6, line 4 and Figures 1-2).

Rasche et al. fails to disclose a first number of the first time points is smaller than a second number of the second time points and the second number of second time points is determined from the first time points by interpolation.

Kachelriess et al. teaches a first number of the first time points is smaller than a second number of the second time points and the second number of second time points is determined from the first time points by interpolation (Abstract and Pages 1884-1888, Section B. Algorithm 180° MCI).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Rasche et al. to include the interpolation of Kachelriess et al., since a person would have been motivated to make such a modification to improve image quality thereby reducing artifacts in multiplanar reformations (Abstract) as taught by Kachelriess et al.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. as applied to claim 1 above, and further in view of Vaillant et al. (6,385,285).

With respect to claim 4, Rasche et al. discloses a method as recited above. Rasche et al. further discloses the volumetric data correspond to a coronary artery region (Page 4, lines 23-25) and simultaneously measured electrocardiogram data (E);

optimization (Page 6, lines 5-7); and

a plurality of motion fields (B) is determined for estimating the motion of the object (Page 5, lines 28-30).

Rasche et al. fails to disclose the image is reconstructed on the basis of an iterative reconstruction optimization.

Vaillant et al. teaches the image is reconstructed on the basis of an iterative reconstruction (Col. 2, lines 16-18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Rasche et al. to include the iterative reconstruction of Vaillant et al., since a person would have been motivated to make such a modification to improve imaging by utilizing a proven method of reconstruction which provides good image quality while from a limited number of input projection image (Col. 1, lines 54-60) as implied by Vaillant et al.

7. Claims 5-6 and 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. and Vaillant et al. as applied to claims 4 and 9 above, and further in view of Chen et al. ("Kinematic and Deformation Analysis of 4-D Coronary Arterial Trees Reconstructed From Cine Angiograms", June 2003, IEEE, Volume 22, Number 6, Pages 710-721).

With respect to claim 5, Rasche et al. as modified above suggests the method as recited above.

Rasche et al. fails to explicitly disclose the selection of the projections from the plurality of projections corresponds to a setting of a gating window;

on a variation of the gating window, a new image is reconstructed on the basis of the iterative reconstruction optimization in real-time;

the new image is displayed on a display such that a real-time optimization is provided.

Vaillant et al. teaches the selection of the projections from the plurality of projections corresponds to a setting of a gating window (Col. 2, lines 44-48);

the image is necessarily displayed on a display such that a real-time optimization is provided (Col. 1, lines 65-66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the method of Rasche et al. as modified above the selecting and displaying of Vaillant et al., since a person would have been motivated to make such a modification to improve successful outcomes of a surgical procedure involving the placement of a stent by selecting and displaying only those images corresponding to a precise instant of the cardiac cycle need to successfully complete the procedure (Col. 2, lines 44-48) as implied by Vaillant et al.

Chen et al. teaches on a variation of the gating window, a new image is reconstructed on the basis of the iterative reconstruction optimization in real-time (Page 710, Col. 2, line 45 – Page 711, Col. 1, line 6, Page 719, Col. 1, lines 37-56 and Figure 8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the method of Rasche et al. as modified above the reconstructing of Chen et al., since a person would have been motivated to make such a modification to improve patient outcomes and to enhance patient safety during percutaneous catheter-based interventions (Page 719, Col. 2, lines 38-42) as taught by Chen et al.

With respect to claim 6, Rasche et al. as modified above suggests the method as recited above. Rasche et al. further fails to disclose the variation of the gating window is based on the first time points such that the gating window is automatically set to time points where there is minimal motion in the object such that the new image is automatically optimized.

Chen et al. further teaches the variation of the gating window is based on the first time points such that the gating window is automatically set to time points where there is minimal motion in the object such that the new image is automatically optimized (Page 710, Col. 2, line 45 – Page 711, Col. 1, line 6, Page 719, Col. 1, lines 37-56 and Figure 8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the method of Rasche et al. as modified above the reconstructing of Chen et al., since a person would have been motivated to make such a modification to improve patient outcomes and to enhance patient safety during percutaneous catheter-based interventions (Page 719, Col. 2, lines 38-42) as taught by Chen et al.

With respect to claim 11, Rasche et al. a device as recited above. Rasche et al. further discloses the volumetric data correspond to a coronary artery region (Page 4, lines 23-25) and simultaneously measured electrocardiogram data (E).

Rasche et al. fails to explicitly disclose the image processing device is a multi-slice computed tomography (CT) system.

Rasche et al. fails to disclose the selection of the projections from the plurality of projections corresponds to a setting of a gating window;

on a variation of the gating window, a new image is reconstructed on the basis of an iterative reconstruction optimization in real-time;

and the new image is displayed on a display such that a real-time optimization is provided.

Vaillant et al. teaches the selection of the projections from the plurality of projections corresponds to a setting of a gating window (Col. 2, lines 44-48);

an image is reconstructed on the basis of an iterative reconstruction optimization in real-time (Col. 1, lines 65-66 and Col. 2, lines 16-18);

and the image is necessarily displayed on a display such that a real-time optimization is provided (Col. 1, lines 65-66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Rasche et al. to include the selecting, iterative reconstructing and displaying of Vaillant et al., since a person would have been motivated to make such a modification to improve imaging by utilizing a proven method of reconstruction which provides good image quality while from a limited number of input projection image and to improve successful outcomes of a surgical procedure involving the placement of a stent by selecting and displaying only those images corresponding to a precise instant of the cardiac cycle need to successfully complete the procedure (Col. 1, lines 54-60 and Col. 2, lines 44-48) as implied by Vaillant et al.

Chen et al. teaches on a variation of the gating window, a new image is reconstructed on the basis of the iterative reconstruction optimization in real-time (Page 710, Col. 2, line 45 – Page 711, Col. 1, line 6, Page 719, Col. 1, lines 37-56 and Figure 8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the device of Rasche et al. as modified above the reconstructing of Chen et al., since a person would have been motivated to make such a modification to improve patient outcomes and to enhance patient safety during percutaneous catheter-based interventions (Page 719, Col. 2, lines 38-42) as taught by Chen et al.

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. in view of Vaillant et al. and Chen et al. as applied to claim 5 above, and further in view of Flohr et al. (6,381,487).

With respect to claim 7, Rasche et al. as modified above suggests the method as recited above. Rasche et al. further discloses an input from a user (Page 7, line 21) for optimization (Page 6, lines 5-7).

Rasche et al. fails to disclose interactive.

Flohr et al. teaches interactive (Figures 12-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the method of Rasche et al. as modified above the interacting of Flohr et al., since a person would have been motivated to make such a modification to improve imaging results by allowing the operator vary parameters until a satisfactory image in a desired phase is achieved (Col. 9, lines 24-32) as taught by Flohr et al.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. in view of Vaillant et al. as applied to claim 4 above, and further in view of Grangeat et al. ("Theoretical framework for a dynamic cone-beam reconstruction algorithm based on a dynamic particle model",17 July 2002, Phys. Med. Biol., Volume 47, Pages 2611-2625).

With respect to claim 8, Rasche et al. as modified above suggests the method as recited above.

Rasche et al. further teaches segmenting the coronary vessel tree from the volumetric data; and

the determination of the plurality of motion fields is performed such that the plurality of motion fields describes motions of areas of the coronary vessel tree (Page 3, lines 24-25).

Rasche et al. as modified above fails to disclose performing a sliding reconstruction of the volumetric data.

Grangeat et al. teaches performing a sliding reconstruction of the volumetric data (Section 4. The dynamic cone-beam reconstruction algorithm, pages 2615-2621).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the method of Rasche et al. as modified above the sliding of Grangeat et al., since a person would have been motivated to make such a modification to improve imaging without increasing the dose to the patient (Abstract) Grangeat et al.

10. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. in view of Hsieh (6,529,575).

With respect to claim 12, Rasche et al. discloses the following operation:

estimating a motion of an object (Page 5, lines 14-20, ECG used to estimate motion by determining phase);

determining first time points (phase of motion) where the motion of the object is minimal on the basis of the estimated motion of the object (Page 1, lines 15-18); and

selecting projections from a plurality of projections on the basis of the first time points (Page 5, lines 16-27 and Figure 1); and

reconstructing an image from the projections selected from the plurality of projections (Figure 1).

Rasche et al. fails to explicitly disclose a machine readable medium having instructions recorded thereon configured to instruct a computer to perform operations.

Hsieh teaches a machine readable medium having instructions recorded thereon configured to instruct a computer to perform operations (Col. 8, line 57 - Col. 9, line 12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the configuration of Rasche et al. to include a machine readable medium of Hsieh, since a person would have been motivated to make such a modification to more easily update existing systems to implement the invention (Col. 8, line 66 - Col. 9, line 1) as taught by Hsieh.

With respect to claim 13, Rasche et al. further discloses a plurality of motion fields (B) is determined for estimating the motion of the object (Page 5, lines 28-30);

volumetric data correspond to cardiac computer tomography (CT) data (Page 5, lines 8-9 and 28-34) and simultaneously measured electrocardiogram data (E);

a number of low resolution images (I) corresponding to a heart region (Page 5, lines 28-32 and Figure 1) are reconstructed;

the number of low resolution images corresponds to a plurality of phase points of the heart(Page 5, lines 21-27 and Figure 1);

the determination of the plurality of motion fields is performed for the number of low resolution images such that the plurality of motion fields describes the motion of the object between the number of low resolution images(Page 5, line 30 – Page 6, line 4);

determining a high resolution map of second time points (T) where the motion of the heart is minimal (Page 6, lines 12-15) on the basis of the first time points (Figures 1 and 2);

selecting second projections (K) from the plurality of projections on the basis of the second time points (Figures 1 and 2); and

reconstructing a high resolution image (G) from the second projections (Page 7, lines 1-5 and Figure 1 and 2).

11. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasche et al. in view of Hsieh as applied to claim 12, and further in view of Vaillant et al. and Chen et al.

With respect to claim 14, Rasche et al. as modified above suggests the configuration as recited above. Rasche et al. further discloses the volumetric data correspond to a coronary artery region (Page 4, lines 23-25) and simultaneously measured electrocardiogram data (E).

Rasche et al. fails to explicitly disclose the image processing device is a multi-slice computed tomography (CT) system.

Rasche et al. fails to disclose the selection of the projections from the plurality of projections corresponds to a setting of a gating window;

on a variation of the gating window, a new image is reconstructed on the basis of an iterative reconstruction optimization in real-time;

and the new image is displayed on a display such that a real-time optimization is provided.

Vaillant et al. teaches the selection of the projections from the plurality of projections corresponds to a setting of a gating window (Col. 2, lines 44-48);

an image is reconstructed on the basis of an iterative reconstruction optimization in real-time (Col. 1, lines 65-66 and Col. 2, lines 16-18);

and the image is necessarily displayed on a display such that a real-time optimization is provided (Col. 1, lines 65-66).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the configuration of Rasche et al. as modified above to include the selecting, iterative reconstructing and displaying of Vaillant et al., since a person would have been motivated to make such a modification to improve imaging by utilizing a proven method of reconstruction which provides good image quality while from a limited number of input projection image and to improve successful outcomes of a surgical procedure involving the placement of a stent by selecting and displaying only those images corresponding to a precise

instant of the cardiac cycle need to successfully complete the procedure (Col. 1, lines 54-60 and Col. 2, lines 44-48) as implied by Vaillant et al.

Chen et al. teaches on a variation of the gating window, a new image is reconstructed on the basis of the iterative reconstruction optimization in real-time (Page 710, Col. 2, line 45 – Page 711, Col. 1, line 6, Page 719, Col. 1, lines 37-56 and Figure 8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the configuration of Rasche et al. as modified above the reconstructing of Chen et al., since a person would have been motivated to make such a modification to improve patient outcomes and to enhance patient safety during percutaneous catheter-based interventions (Page 719, Col. 2, lines 38-42) as taught by Chen et al.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Saito et al. ("Real-Time Four-dimensional Imaging of the Heart with Multi-Detector Row CT", 14 October 2002, RadioGraphics, Published online, http://radiographics.rsnajnls.org/cgi/content/abstract/23/1/e8?maxtoshow=&HITS=20&hits=20&RESULTFORMAT=&searchid=1&FIRSTINDEX=0&displaysectionid=Online-only+Exhibits&resourcetype=HWCIT) discloses a real-time cardiac imaging method which allows dynamic selection of reconstruction windows and the generation of 4D movies (Entire article).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN M. CORBETT whose telephone number is (571)272-8284. The examiner can normally be reached on M-F 8 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. M. C./
Examiner, Art Unit 2882

/C. G. K./

/Edward J Glick/
Supervisory Patent Examiner, Art Unit 2882